

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for removing a tissue or organ from vitrification in a solution containing cryoprotectant, comprising:

warming the vitrified tissue or organ in said solution containing cryoprotectant at a rate less than 50°C per minute to a temperature between -80°C and the glass transition temperature;

further warming the tissue or organ in said solution at a rate greater than 80°C per minute to a temperature above -75°C, wherein, at said temperature, the solution is sufficiently fluid that the tissue or organ can be removed therefrom; and

immersing the tissue or organ in a series of solutions having decreasing concentrations of cryoprotectant to obtain ~~a~~the tissue or organ in a cryoprotectant-free solution,

wherein the method occurs under normal physiological pressure.

2. (Original) The method of claim 1, wherein the vitrified tissue or organ is warmed to a temperature between -80°C and the glass transition temperature at an average rate of from 20 to 40°C per minute.

3. (Original) The method of claim 1, wherein the tissue or organ is warmed from a temperature between -80°C and the glass transition temperature to a temperature above -75°C at an average rate of from 200 to 300°C per minute.

4. (Original) The method of claim 3, wherein the tissue or organ is warmed at an average rate of from 200 to 300°C per minute to a temperature above -35°C.

5. (Original) The method of claim 1, wherein each solution of said series of solutions has a temperature above -15°C.

6. (Original) The method of claim 1, wherein, in each immersion step, said tissue or organ is also perfused with said solution.

7. (Original) The method of claim 1, wherein the tissue or organ is immersed in each solution of said series of solutions for a sufficient time to achieve approximate osmotic equilibration.

8. (Original) The method of claim 1, wherein the tissue or organ is immersed in each solution of said series of solutions for at least 10 minutes.

9. (Original) The method of claim 1, wherein the tissue or organ is immersed in a series of six solutions having decreasing concentrations of cryoprotectant, wherein the sixth solution is cryoprotectant-free.

10. (Original) The method of claim 9, wherein the tissue or organ is immersed in each solution of said series of six solutions for sufficient time to achieve approximate osmotic equilibration.

11. (Original) The method of claim 9, wherein the tissue or organ is immersed in each solution of said series of six solutions for at least 10 minutes.

12. (Original) The method of claim 9, wherein the cryoprotectant concentration of said six solutions are: 40 to 60% of said concentration sufficient for vitrification; 30 to 45% of said concentration sufficient for vitrification; 15 to 35% of said concentration sufficient for vitrification; 5 to 20% of said concentration sufficient for vitrification; 2.5 to 10% of said concentration sufficient for vitrification; and 0% of said concentration sufficient for vitrification.

13. (Original) The method of claim 9, wherein each of said six solutions comprises an osmotic buffering agent.

14. (Original) The method of claim 13, wherein said osmotic buffering agent is a low molecular weight osmotic buffering agent.

15. (Original) The method of claim 14, wherein said osmotic buffering agent is mannitol.

16. (Original) The method of claim 13, further comprising immersing said tissue or organ in a second cryoprotectant-free vehicle solution, which does not contain an osmotic buffering agent, after said immersion in said cryoprotectant-free solution, which does comprise said osmotic buffering agent.

17. (Original) The method of claim 1, wherein said tissue or organ is at least one tissue or organ, natural or engineered, vascularized or a vascular, selected from the group consisting of blood vessels, musculoskeletal tissue, cartilage, menisci, muscles, ligaments, tendons, skin, cardiovascular tissue, heart valves, myocardium, periodontal tissue, glandular tissue, islets of Langerhans, cornea, ureter, urethra, pancreas, bladder, kidney, breast, liver, intestine and heart.

18. (Original) The method of claim 1, wherein said tissue or organ is a blood vessel.

19. (Original) The method of claim 1, wherein said tissue or organ is heart valve tissue.

20. (Original) The method of claim 1, wherein said tissue or organ is cartilage.

21. (Original) The method of claim 1, wherein at least 50% of a measured function of the tissue or organ is maintained as compared to fresh tissues or organs.

22. (Original) The method of claim 1, wherein said method is accomplished without perfusing said tissue or organ.

23. (Original) A method for vitrification of a tissue or organ and subsequent removal from vitrification, comprising:

immersing the tissue or organ in a series of solutions having increasing concentrations of cryoprotectant to achieve a cryoprotectant concentration sufficient for vitrification, each solution of said series of solutions having a temperature above -15°C ;

cooling the tissue or organ in a solution having said cryoprotectant concentration sufficient for vitrification at an average rate of from 2.5 to 100°C per minute from a temperature above -15°C to a temperature between -80°C and the glass transition temperature;

further cooling the tissue or organ at an average rate less than 30°C per minute from a temperature that is between -80°C and the glass transition temperature to a temperature below the glass transition temperature to vitrify the tissue or organ; and

removing the tissue or organ from vitrification by the method of claim 1.

24. (Original) The method of claim 23, wherein at least 50% of a measured function of the tissue or organ is maintained as compared to fresh tissues or organs.

25. (Original) The method of claim 23, further comprising storing the vitrified tissue or organ after cooling and prior to warming.